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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/797,241

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Mark Muenzer

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EXAMINER

THOMAS, LUCY M

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/797,241	Applicant(s) MUENZER ET AL.	
	Examiner Lucy Thomas	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 7-10, 16, and 2-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Marquardt et al. (US 5,650,906). Regarding Claim 7, Marquardt et al. discloses a circuit arrangement for limiting an overvoltage at a freewheeling device arranged in parallel with a semiconductor power switch (Figures 1 and 2), comprising at least a first and a second semiconductor power switch T1, T2 each parallel-connected with a freewheeling device 24, 26 being connected in series, an output terminal R (S, T) arranged between the first and second semiconductor power switch for coupling with to an inductive load, and a feedback path (see path from C to G in Figures 1 and 2) between the output of each semiconductor power switch and an amplifier stage 46 of a driver 6 (see C connected to amplifier 46 at 50 and 48 in Figure 3, which shows the details of Figure 2) connected to its control terminal G of each power switch (Column 3, lines 40-60). Figure 2 of the Marquardt reference shows the block diagram of the circuit arrangement and Figure 3 shows the details of the feedback connection to an amplifier stage of a driver, and therefore, meets the limitations of the amended claim.

Regarding Claim 8, Marquardt et al. discloses a circuit arrangement, wherein a feedback path has at least one component 20 or 22 (Figure 1), which permits a driving

of the control terminal only above a threshold voltage, so that only voltages greater than a predetermined threshold value are fed back to the control terminal.

Regarding Claim 9, Marquardt et al. discloses a circuit arrangement, wherein the feedback path has a component 28 (Figure 2), via which a feedback to the control terminal is effected in a manner proportional to the voltage rise at the freewheeling device.

Regarding Claim 10, Marquardt et al. discloses a circuit arrangement, wherein two diodes 16, 20 or 18, 22 (see Figure 1) connected in antiparallel are used as the components in the feedback path. The reference has Zener diode elements.

Regarding Claim 16, Marquardt discloses an IGBT power transistor T1, T2 as the semiconductor power switch (Figures 1 and 2, Column 2, lines 4-8).

Regarding method Claims 2-6, the recited method steps would necessarily be performed when implementing the circuit arrangement for limiting the overvoltage at a freewheeling device recited in Claims 7-10. Marquardt discloses each of the first and second semiconductor power switches T1, and T2 being parallel connected with an associated freewheeling device 24, and 26, and the voltage at the associated freewheeling device is fed back via a feedback path to an output stage of a gate driver 6 connected to the control terminal of the turned-off semiconductor power switch as recited in the amended Claim 5. Claim 6 basically recites the elements of Claim 5, except that an emitter terminal is recited. The device recited in Claims 7-10 would necessarily operate in the recited manner. The reference discloses the feedback path, wherein the voltage at the associated freewheeling device is fed back via a feedback

path to an output stage of a gate driver 6 connected to the control terminal of the turned-off semiconductor power switch as recited in the amended Claim 5. Therefore, the reference meets the limitations of the amended claims.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marquardt et al. (US 5,650,906) in view of Erckert (US 6,100,742). Regarding Claim 11, Marquardt fails to disclose a capacitor used as the component in the feedback path. Erckert discloses a capacitor 34 (Figure 1), C2 (Figure 5). It would have been obvious to those skilled in the art to modify Marquardt's circuit to include a capacitor in the feedback path as taught by Erckert because capacitors respond to higher frequency events (like transients), and in case of overvoltages across the freewheeling diode, aid the turn-on of the power transistor.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marquardt et al. (US 5,650,906) in view of Goesser et al. (US 6,531,908). Regarding Claim 12, Marquardt fails to disclose a parallel circuit comprising Zener diodes and an external capacitor used in the feedback path. Goesser et al. discloses a parallel circuit comprising Zener diodes and an external capacitor used in the feedback path (see Figure 2). It would have been obvious to those skilled in the art to modify Marquardt's

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circuit to include a parallel circuit comprising Zener diodes and an external capacitor in the feedback path as taught by Goesser, because both the Zener diode and the capacitor increase the accuracy of transient response with respect to voltage threshold and frequency and in case of overvoltages across the freewheeling diode to switch-on the power transistor, and a parallel arrangement provides a faster response.

6. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marquardt et al. (US 5,650,906) in view of Stephan et al. (DE 100 317 78). Claim 13 basically recites combined limitations of Claims 7 and 8, except the recitation of a threshold value of the current gradient, which is objected to in the beginning of this Office Action. Marquardt discloses the need for minimizing the parasitic inductances (Column 1, lines 18-22), but fails to disclose the current gradient limitation. Stephan discloses a circuit arrangement comprising a semiconductor power switch 1, wherein a feedback path being designed such that it permits a control terminal of the switch to be driven up only above a threshold of a current gradient (see Abstract). It would have been obvious to those skilled in the art to modify Marquardt's circuit to include current gradient limitation as taught by Stephan, to protect the circuit from the reverse current spike and the additional overvoltage component due to leakage inductances which is equal to the measured current gradient times the leakage inductance.

Regarding Claim 14, Stephan discloses the circuit arrangement, wherein a voltage drop across internal and/or external leakage inductances is utilized for feedback (see Abstract).

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8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marquardt et al. (US 5,650,906) in view of Stephan et al. (DE 100 317 78) and McKenzie (US 5,336,985). Regarding Claim 15, neither Marquardt or Stephan, disclose the circuit arrangement, wherein a current rise is fed back through an induction transformer. McKenzie discloses a feedback wherein a voltage drop across leakage inductances is utilized, with a transformer 26 in the feedback path (see Figure 1). It would have been obvious to those skilled in the art to modify Marquardt's and Stephan's circuit to include a feedback wherein a voltage drop across the leakage inductances is utilized, with a transformer in the feedback path, as taught by McKenzie, because the use of feedback produces a more accurate response in circuits having sudden changes in current levels.

### ***Response to Arguments***

7. Applicant's arguments filed 3/14/2006 have been fully considered.

Regarding Applicant's arguments toward the Marquardt reference: Figure 2 of the Marquardt reference shows the block diagram of the circuit arrangement and Figure 3 shows the details of the feedback connection to an amplifier stage of a driver. The reference discloses a feedback path (see path from C to G in Figures 1 and 2) between the output of each semiconductor power switch and an amplifier stage 46 of a driver 6 (see C connected to amplifier 46 at 50 and 48 in Figure 3, which shows the details of Figure 2) and therefore, meets the limitations of the amended claim 1 and 7.

Applicant's arguments with respect to claim 13 have been considered but are moot in view of the new ground(s) of rejection.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LT  
May 22, 2006

  
BURTON S. MULLINS  
PRIMARY EXAMINER